incandescent portion at the point may be brought to the shape desired, and the temperature raised by passing rapidly through the air, or *vice versa*, lowered by allowing a trifling coating of ash to accumulate upon the surface. This will burn thus for one or more minutes, according as more or less is charred by the flame, and one or more of the small sticks are used singly or tied together, or the stick made of larger diameter.

It might also be that a tube of some non-conducting material might be filled with an ordinary lampwick, previously prepared, and by a spring regulated to keep the ignited portion of the combustible material constantly pressed out at one end.

DOMESTIC SUMMARY.

Fissures occurring in Long Bones; with Remarks on V-shaped Fractures of the Tibia.—Dr. R. M. HODGES, in an interesting paper with the above title (*Boston Med. and Surg. Journ.*, Jan. 11, 1877) calls attention to fissures, or cracks, occurring in long bones, particularly the tibia.

The term "fissure" applies to a line of fracture varying in length, the sides of which are in apposition, penetrating through, or partly through, the solid shaft of a bone, and unattended by the separation of fragments. The statement of Malgaigne, that if a fissure involves the whole thickness of the shaft it must extend to one or the other extremity of the bone, is entirely at variance with facts. The gravity of this lesion is unquestionable. A force which disrupts, in the most unyielding direction of its fibres, the shaft of an adult long bone, often at a distance from the point where the violence centres, must be powerful enough to cause serious results.

Certain symptoms, under circumstance to be described, justify the opinion that a fissure exists; but the diagnosis is difficult, and sometimes impossible, even when there is a wound of the soft parts.

It is a well-known fact that brittle cylinders tend to break by lines which assume a spiral direction. Any collection of glass tubes will illustrate this point in their broken extremities or the accidental fractures they may have undergone. It will also show that, almost invariably, a crack in the glass extends the spiral a certain distance into the tube, beyond the broken point. The extent to which this principle is applicable to the fractures of bones is still hardly realized, although attention has been called to it by Gerdy, H. Larrey, Houel, and, emphatically, by Gosselin. Fissures exhibit the influence of this law by generally assuming a more or less spiral direction.

Three varieties of crack. or fissure, may described:—

I. Those unaccompanied by other fracture.
II. Those starting from a fracture.
III. Those accompanied by, but disconnected with, a fracture.

The first variety may be called the true fissure. No example of it exists in the museums of this city. The elaborate article of Poncet[1] admits but three incontestable cases. It occurs so rarely that instances reported have been subjected to searching criticism. Those radiating from bullet-wounds it is claimed should be excluded from consideration. A femur from the museum of Val de Grâce, with an interrupted linear fissure extending nearly the whole length of its anterior surface, figured by Malgaigne, is without history. It has been suggested that in this, as in other specimens without history, the apparent fissures are really "season cracks," and the result of desiccation or weather exposure. That figure by Gürlt (1862) might in fact be called a longitudinal fracture of the humerus, rather than a fissure, so widely separated are the two sides of the cleft. As, however, well-marked examples of fissure are found entirely independent of the lines of coexisting fracture, it would seem very reasonable to conclude that they may occur when no solution of continuity has taken place. The propriety of recognizing the second variety of fissure has also been questioned. Even if it should properly be regarded as but a longitudinal fracture, or at most an eccentric accessory, it still constitutes an interesting form of injury on account of its comparative rarity, and is of great importance from a clinical point of view.

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[1] Nouveau Dict. de Méd. et de Chir., article Jambe, 1874.

A very perfect instance of this fissure, entitled Crack in the Neck of the Femur, is described and figured by Dr. H. J. Bigelow in his work on The Hip. No illustration can convey an adequate idea of its remarkable extent and elasticity. Starting from a transverse fracture eight inches below the trochanter, it runs spirally upward round the shaft and cervix of an unusually solid and large femur, and "terminates on the under side of the neck, in an S-shaped extremity, an inch from the point where the fissure crosses the intertrochanteric line in front." It could undoubtedly be converted into a complete fracture with little force. The sides of the fissure are closely in apposition, but can be made to spring apart one-eighth of an inch in the neck of the bone, even in the present dry state of the specimen.[1]

Dr. Hodges reports another instance of this variety, which is also a typical specimen of what has been called V-shaped fracture of the tibia, as well as a case of the third variety of fissure. In the latter the continuity of the tibia is destroyed at two points. At its upper part by a spiral fracture, in the lower fragment of which a fissure is seen continuing the line of the break to a transverse and dentated fracture, where its further course is arrested. A second fissure extends downward more than an inch from the last-named fracture.

The interesting feature of this specimen, however, is a series of radiating fissures at the lower part of the tibia, diverging in all directions, varying in depth, and opening and closing if the bone is twisted. This complex fissure has no connections with the fractures, its nearest approach being two inches distant. None of its lines encircle the shaft. They are confined to one-half of its circumference, but can be traced longitudinally two and three-quarters inches.

The case of fissure extending to the ankle-joint in connection with a V-shaped fracture of the tibia is of extreme interest. The shaft of the bone exhibits a fracture at the junction of its middle and lower thirds, with the pointed and symmetrically V-shaped extremity of the upper fragment received into a corresponding vacancy in the lower. It will be observed by their relation to the malleolus that these V's involve the internal or subcutaneous surface of the shaft only, and do not trench upon the crest of the bone. The line of complete fracture, at an angle of about forty-five degrees, is uniformly and evenly spiral. From the apex of the V in the lower fragment there starts a fissure, continuous with the spiral line of the fracture, winding round the shaft to the peroneo-tibial articulation, and from this point traversing the extremity of the tibia to the base of the inner malleolus. This fissure at its upper part is joined by a second, beginning on the opposite side of the bone at the fracture, and circumscribing quite a large fragment, which, however, rests firmly fixed in place.

The patient from whom this specimen came was an intemperate woman, aged thirty-seven. The tibia was broken at its lower third, and the fibula at a point further down. There was no external wound, and but little displacement. Great swelling ensued, followed by abscesses and gangrene. The tibia protruded in front of the leg, and the fibula at the ankle. The constitutional symptoms were severe, and for a time the patient's life was in danger. She entered the Massachusetts General Hospital thirteen weeks after the accident, and Dr. Hodges performed amputation through the middle of the leg. A good recovery followed.

This form of fracture was first described by Gosselin.[2] It has an anatomy of fixed and absolute character, yet it has failed to attract the attention which its peculiarity and importance claim. Although French and German authors speak of it with more or less detail, no English or American work, so far as I am aware, makes any allusion to its existence.

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[1] Amer. Journ. of Med. Sciences, April, 1857, p. 306.

[2] Gazette des Hôpitaux, 1855.

At first sight there is little to distinguish a V-shaped fracture of the tibia from a common oblique fracture. In the latter the projecting point of the upper fragment is usually very sharp, and belongs to the crest of the tibia. In the former it is broad, never in the crest, but always in the internal, subcutaneous surface of the bone. The two sides of the point are of equal length, and are received into an open V in the lower fragment. The line of the fracture is invariably a spiral one, and the names "spiral" and "spiroidal" have been applied to it. But these have been objected to because they characterize nothing peculiar to this injury; whereas the term "V-shaped" designates that feature of the fracture, recognizable through the integuments, which reveals an important lesion that would not be suspected if this indication were wanting. Whenever this V is observed, there are always present: 1st, a serious disturbance of the medulla; and 2d, a fissure, starting from the apex of the V, winding spirally around the shaft, and extending to the articulating surface of the tibia, which it traverses. This fracture, therefore, is distinguished from all others by its stereotyped features, and the constant accompaniment of a fissure down to and into the ankle-joint. These characteristics are so unfailing that it is said, if you have seen one specimen you have seen all ("qui a vu l'un a vu l'autre"). The illustrations representing this fracture offer a striking uniformity. Gosselin, Follin, A. Bichard (who gives four figures on one page), and the Nouveau Dictionnaire de Médecine et de Chirurgie, reproduce almost identical outlines. It usually occurs at the union of the middle and lower thirds of the bone. The fibula is commonly, but not always broken. The mechanism of its production is a matter of dispute. The splitting of the lower fragment by the wedge-shaped upper one, and the crushing of the medulla, resemble the well-known phenomena of impaction.

The specimens figured show, however, that a V-shaped fracture of the tibia is not the only one attended by prolonged fissure. Thus, in a common oblique fracture of the tibia, of which figures are given, the apex of the upper fragment being at the crest, there is a fissure, linear and not spiral, in the thin parietes of the shaft, which does not continue the line of the main fracture. Other figures represent a fracture high up in the tibia. The fissure which starts in the lower fragment is arrested in its progress by an intervening transverse fracture. Other fissures, disconnected with and below this fracture, extend their irregular outlines to the lower portion of the bone.

The conclusion to which we arrive is, therefore, that a fissure may exist undetected; but if in a broken leg, the fracture is upon the internal, subcutaneous surface of the tibia, and its upper fragment reveals a broad and short V-shape, then the presence of this additional lesion may be safely assumed. Under these circumstances a tender and sensitive shaft, or a swollen and stiff ankle-joint have great significance, and lead to the suspicion of grave injury.

The peculiar shape of the broken bone in a V-shaped fracture makes it a matter of difficulty to keep the upper fragment in position. Slough by pressure not unfrequently happens, and the simple fracture becomes compound, both fracture and ankle-joint being opened to the air. As a rule, a fatal result then takes place. Contusion of the medulla is quickly followed by suppurative osteo-myelitis if the air has access to it. The products of putrefaction in the oil of the medullary cavity appear to be specially deleterious, and provoke blood-poisoning with great rapidity. Fatty emboli, in a putrid state, have been repeatedly found in the lungs of patients who have died from V-shaped fractures. On the other hand, it may be kept in mind that the general prognosis is less serious than some of the early observations seemed to indicate. In spite of long delay, recovery often takes place in cases uncomplicated by a wound, leaving, however, a degree of stiffness in the ankle greater than usually occurs from the mere vicinity of a break.

Amputation is indicated whenever this fracture, at the time of the accident, or, at later period, becomes compound. Gosselin, in his first paper, remarked that "he was almost disposed to say the complication of a wound was a piece of good fortune, since it spurred the hand of the surgeon, and made obligatory the amputation, which alone could save the patient's life." Verneuil states that he lost all the patients with compound V-shaped fracture whose limbs he tried to save, while two out of three amputations were followed by recovery. Poncet says that at the Military Hospital of Strasbourg three V-shaped fractures with wounds, but without much apparent injury, and which seemed to justify attempts at conservation, proved fatal. Dr. Hodges' experience, limited to two cases, corroborates these observations.

A degree of irregularity of union attends the permanent consolidation of these fractures. Contrary to the general rule, by which the foot inclines to turn outwards, the foot here turns inwards. If the patient, lying down, is asked to put his feet side by side, he dose so only by turning the knee and thigh outwards. Nor can he put his knees side by side except by turning the foot and lower part of the leg inwards. This distortion may be absent at the time of the injury, or, if present, is readily obviated; but, during treatment, the upper fragment of the tibia, and the thigh, little by little, rotate outwards, until, when noticed, the deformity is permanent. This result is stated to occur only in connection with a V-shaped fracture of the tibia. Dr. Hodges has never verified this observation, but, if correct, it calls attention to a tardy diagnostic sign, which may throw light upon a protracted case, and moderate too sanguine expectatious of speedy recovery.

Persistent pain often follows what may be called "recovery" from a V-shaped fracture. Dr. Hodges has seen two instances where the contour of the united bones, together with the symptom just spoken of, led him to diagnosticate this injury. A deep-seated inflammation of bone, or of the periosteum, does not always betray itself by external signs; but a lingering soreness in the tibia, especially if accompanied by pain and stiffness in the ankle-joint, may, in view of the facts here enumerated, find its explanation in the existence of this peculiar fracture.

Case of Persistent Priapism.—Dr. M. M. Walker, Physician to the Virginia Prison, reports (*Virginia Medical Monthly*, Feb. 1877) the case of a negro convict, aged 26, who appeared at sick call on July 14, holding his penis with both hands, which, if let go, assumed almost a perpendicular position, and was found, upon examination, to be hard, erect, painful, and fully distended, except the glans, which did not seem to sympathize with the rest of the organ, but which was in an almost wrinkled condition. He stated that he waked up about the middle of the night, of July 12, in that condition, and thought he had been dreaming, but did not remember the purport of his dreams. The next day, he used cold water freely, hoping and expecting the penis to subside. Careful examination failed to detect any disease of any organ or tissue. He stated that he had not been practising masturbation, and had had no venereal disease, but had been "bad after women." He was apparently in perfect health, and there was no symptom to treat but the erection. Complete anæsthesia by chloroform had not the slightest effect upon the penis, nor had ice bags to the spine, bromide of potassium or belladonna ointment locally applied. The urine had to be drawn off by a flexible catheter, which was introduced without any difficulty. He stated that he had no sexual desire, and did not think intercourse would give him relief.

July 18. The patient is considerably prostrated. There is, and has been during the night, profuse diaphoresis. A few dops of urine passed about one or two o'clock in the night, but the usual quantity was drawn this morning. The organ has not softened in the slightest degree. The hot bath and suppositories of assafœtida and belladonna were then tried without effect. Tartar emetic in half-grain doses every hour until vomiting was produced "that effect to be kept up during the day" and chloral at night was tried in vain. On the 28th "Norwood's tincture," ten drops every three hours until the pulse is reduced to fifty, was ordered. A hard ring around the cavernous bodies about the size of a slate pencil and about two inches below the glans, was noticed. On the 31st the effect of the veratrum became evident: the pulse was a little below fifty, and the penis much relaxed. August 10. Improvement gradual from day to day, but is well marked at this date, but in the intervening time, when the medicine has been stopped on one or two occasions, the organ has become hard and painful again. From this time the treatment is discontinued